

## ARAC ESHWG REPORT 25.1310

### NOTE

There is not yet a FAR/JAR 25.1310. JAA has issued NPA 25F-281 for this paragraph but FAA has not yet issued related NPRM. The NPRM is now in for the FAA's Legal review and comments. The hope is to publish it prior to the publication of the fast-track harmonization proposals. It is assumed that NPRM on 25.1309/25.1310 will be published before the package covered in this report.

### **1 - What is underlying safety issue addressed by the FAR/JAR?**

Proposed FAR/JAR 25.1310 presently covered by FAR/JAR 25.1309(e) and (f) define what is an 'essential load' on the power supply and the conditions under which those loads must be supplied.

### **2 - What are the current FAR and JAR standards?**

#### Current FAR text:

*Based on SD&A HWG proposal  
(NPA 25F-281 on JAA side, NPRM not yet published on the FAA side)*

#### **Section 25.1310 Power source capacity and distribution.**

- (a) Each installation whose functioning is required for type certification or by operating rules and that requires a power supply is an "essential load" on the power supply. The power sources and the system must be able to supply the following power loads in probable operating combinations and for probable durations.
  - (1) Loads connected to the system with the system functioning normally.
  - (2) Essential loads, after failure of any one prime mover, power converter, or energy storage device.
  - (3) Essential loads after failure of –
    - (i) Any one engine on two-engined airplanes; and
    - (ii) Any two engines on three-or-more engined airplanes.
  - (4) Essential loads for which an alternate source of power is required, after any failure or malfunction in any one power supply system, distribution system, or other utilization system.
- (b) In determining compliance with paragraphs (a)(2) and (3) of this section, the power loads may be assumed to be reduced under a monitoring procedure consistent with safety in the kinds of operation authorized. Loads not required in controlled flight need not be considered for the two-engine-inoperative condition on airplanes with three or more engines.

#### Current JAR text:

*Based on SD&A HWG proposal  
(NPA 25F-281 on JAA side)*

#### **JAR 25.1310 Power source capacity and distribution**

- (a) Each installation whose functioning is required for type certification or by operating rules and that requires a power supply is an "essential load" on the power supply. The power sources and the system must be able to supply the following power loads in probable operating combinations

and for probable durations (see ACJ 25.1310(a)):

- (1) Loads connected to the system with the system functioning normally.
- (2) Essential loads, after failure of any one prime mover, power converter, or energy storage device.
- (3) Essential loads after failure of -
  - (i) Any one engine on two-engined aeroplanes; and
  - (ii) Any two engines on three-or-more engined aeroplanes.

After the failure of any two engines on a three-engined aeroplane, those services essential to airworthiness must continue to function and perform adequately within the limits of operation implied by the emergency conditions. (See ACJ 25.1310(a)(3).)

- (4) Essential loads for which an alternate source of power is required, after any failure or malfunction in any one power supply system, distribution system, or other utilisation system.
- (b) In determining compliance with sub-paragraphs (a)(2) and (3) of this paragraph, the power loads may be assumed to be reduced under a monitoring procedure consistent with safety in the kinds of operation authorised. Loads not required in controlled flight need not be considered for the two-engine-inoperative condition on aeroplanes with three or more engines.

### **3 - What are the differences in the standards and what do these differences result in?**

These requirements, formerly contained in FAR/JAR 25.1309(e) and (f), are not directly related to the other safety and analysis requirements of JAR 25.1309 and are stated separately for the purpose of clarity through NPA 25F-281. JAR 25.1310 and FAR 25.1310 are not be completely harmonised in that JAR 25.1310 contains requirements for maintenance of airworthiness essential services after failure of any two engines on a three-engined aeroplane and makes reference to two ACJs.

### **4 - What, if any, are the differences in the means of compliance?**

JAR has two specific ACJs.

#### **ACJ 25.1310(a)**

**(Same as ACJ No. 6 to JAR 25.1309)**

Power Source Capacity and Distribution (Acceptable Means of Compliance)

See JAR 25.1310(a)

When alternative or multiplication of systems and equipment is provided to meet the requirements of JAR 25.1310(a), the segregation between circuits should be such as to minimise the risk of a single occurrence causing multiple failures of circuits or power supplies of the system concerned. For example, electrical cable bundles or groups of hydraulic pipes should be so segregated as to prevent damage to the main and alternative systems and power supplies.

#### **ACJ 25.1310(a)(3)**

**(Same as ACJ No. 7 to JAR 25.1309)**

Equipment, Systems and Installations (Interpretative Material)

See JAR 25.1310(a)(3)

For aeroplanes for which the two-power-units-inoperative performance is scheduled, such services should remain operative as will enable the flight to be safely continued and terminated. In achieving this -

- a. Some reduction in the performance of particular services is permissible (e.g. airframe ice-protection),
- b. It may be assumed that electrical loads are reduced in accordance with a predetermined procedure which is consistent with safety in the types of operation for which the aeroplane is certificated, and

- c. Consideration should be given to any restrictions that may be necessary should the air supply for cabin pressure be interrupted or seriously reduced consequent upon the failure of the power-units.

**5 – What is the proposed action?**

According to the better plan for harmonisation, FAR/JAR 25.1310 is to be enveloped to the most stringent requirement, which is FAR 25.1310. JAR text can be considered as an alleviation of the services to be maintained after the failure of any two-engines on a three-engined airplane. This should be also applicable on a four (or more) engined aircraft.

**6 - What should the harmonized standard be?**

The standard of FAR 25.1310 as proposed through the SD&A HWG

**7 - How does this proposed standard address the underlying safety issue (identified under #1)?**

The proposal can be considered as a clarification of existing requirements and in line with current practices.

**8 - Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.**

The proposed standard maintains the same level of safety.

**9 - Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.**

This proposal is in line with current industry practices.

**10 - What other options have been considered and why were they not selected?**

The adoption of JAR was considered however for the reasons as stated above FAR was retained.

**11 - Who would be affected by the proposed change?**

As the proposal is in line with current design practices, the effect is considered to be minimum for Aircraft Operators and Manufacturers affected by this change.

**12 - To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?**

None.

**13 - Is existing FAA advisory material adequate? If not, what advisory material should be adopted?**

There is no current published FAA Advisory Material . It is recommended that the JAR ACJ to 25.1310(a) be adopted as FAA advisory material as it provides useful acceptable means of compliance.

**14 - How does the proposed standard compare to the current ICAO standard?**

The proposal is in line with ICAO Annex 8 Chapter 8 Electrical systems

**15 - Does the proposed standard affect other HWG's?**

This proposal does affect the SD&A HWG because it covers part of their proposal for review of 25.1309/1310.

**16 - What is the cost impact of complying with the proposed standard?**

As the proposal is in line with current design practices the cost impact will be negligible.

**17 - Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?**

See 18.

**18 - In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain.**

The ESHWG considers that the Category 1 fast track harmonization process is not appropriate for this rule for the following reasons:

1. Additional time is required to review in more detail the concept of "essential load" due to the fact that the term "essential load" as defined in the current text conflicts with the definition of "essential" used in other sections of the FAR/JAR. This conflict in definitions can lead to various interpretations in the compliance to the rule. The wording of the FAR/JAR should be revised to ensure the correct interpretation of the word "essential".

2. The initial tasking was based on the hypothesis that the proposed 25.1310 coming from the SD&A HWG would be circulated as NPA/NPRM and published as final text. NPA 25F-281 has been published and commented upon, but the equivalent NPRM is still within the FAA. It is impossible to harmonise 25.1310 before it is published.

It is proposed that this task be made a Category 3 item.